Title of Instructional Materials: College Board Spring Board Mathematics with Mearning Algebra I

Grade Level: Algebra I

Summary of College Board Spring Board Mathematics with Mearning Alg I

Overall Rating:	 Weak (1-2) Moderate (2-3) Strong (3-4)	Important Mathematical Ideas:	 Weak (1-2) Moderate (2-3) Strong (3-4)	
Summary / Justification / Evidence: The strong point of this book is that they develop ideas in context and tie them with procedures. The book also engages the students in developing the math rather than just giving them the steps to procedures. One standard that was not covered in the text was N-RN-1 & N-RN-2 dealing with rational exponents. Also, N-RN-3 is weak (p.20-22) IF-3 anf F-BF-2 regarding sequences are also not covered.		Summary / Justification / Evidence: The ideas are conceptually developed in context throughout the (ie absolute value 1-7 p. 51). The text uses multiple approaches even forces the students to reflect on what the advantages are to different approaches (ie #1 p. 332).		
Skills and Procedures:	☐ Weak (1-2) ☐ Moderate (2-3) ☑ Strong (3-4)	Mathematical Relationships:	Weak (1-2)Moderate (2-3)Strong (3-4)	
Summary / Justification / Evident Skills and procedures are integrated ideas, such as quadratics and area (equations (p. 27-38) is introduced with inequality, both big ideas.	d with important mathematical p. 251-263). The idea of	Summary / Justification / Eviden In the same lesson, they integrate n things algebraically, graphically, nu than teaching each approach as an 299).	nultiple approaches and represen Imerically, and verbally rather	

College Board Spring Board Mathematics of Meaning

Algebra I

Overall, covers standards...

Mot as strong as some but for
more of an activity based/experiential
berning... seems to at least touch
on all standards

INDIANA'S EDUCATION UNDTABLE

Instructional Materials **Analysis and Selection**

Phase 3: Assessing Content Alignment to the Common Core State Standards for Mathematics

Traditional Pathway for High School: Algebra I





Phase 3:

Assessing Content Alignment to the Common Core State Standards for Mathematics

A project of

The Indiana Education Roundtable, The Indiana Department of Education, and

The Charles A. Dana Center at The University of Texas at Austin

2010-2011

Reviewed By:



Title of Instructional Materials: College Board - Springboard Mathematics of Meaning Alg I

ALGEBRA I — NUMBER AND QUANTITY (N)

The Real Number System (N-RN)

Extend the properties of exponents to rational exponents.	Summary and documentati met. Cite examples from the	on of how	v the domain, clu	ıster, and stand	ard are
N-RN.1	The same standard from the	Ciliateria	15.		
Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. For example, we define 51/3 to be the cube root of 5 because we want (51/3) = 5/3/3 to be the	Important Mathematical Ideas	I I	2	3	4
$5^{1/3}$ to be the cube root of 5 because we want $(51/3)3 = 5(^{1/3})^3$ to hold, so $(5^{1/3})^3$ must equal 5.	Portugue of the manner of				
	Skills and Procedures	1	2	3	4
	g on two the presidences				
	Mathematical Relationships	I	2	3	4
Indicate the chapter(s), section(s), and/or page(s) reviewed.	Summary / Justification / Ex	vidence	rather, open	ations of na	di calc
	Dente in Li Accremine				
act 4-3 &A 4-1	Portions of the domain, clus developed in the instruction	ster, and s	standard that are als (if any):	e missing or not	well
	mer mile is a New part fac				
	Overall Rating		+		

Reviewed By:	

Title of Instructional Materials:

ALGEBRA I — NUMBER AND QUANTITY (N)

The Real Number System (N-RN)

Extend the properties of exponents to rational exponents.	Summary and documentat met. Cite examples from the	ion of how t	he domain, cl	uster, and stan	dard are
N-RN.2			•		
Rewrite expressions involving radicals and rational exponents using the	Important Mathematical Ideas	(
properties of exponents.	амерока падно выпражение	I state of the sta	2	3	4
	Purity of the domain, ch				
	Skills and Procedures				
	1	1	2	(3)	4
	Mat some Madle escole			Maloring V	A
	Mathematical Relationships	+			
		1	2	3	4
	Summary / Justification / E	vidence			
Indicate the chapter(s), section(s), and/or page(s) reviewed.					
	gravita mar Signa (1795 Si casa				
Lind 4 Overview Act 4-1	Portions of the domain, cludeveloped in the instruction	ister, and st	andard that ars s (if any):	e missing or n	ot well
EA4-1 Unit 4- Unit Brachie	switch (e.g.), nother street littless				
Unit 4- Math Stand . Ruw.	0	ia preta reje			
	Overall Rating	+			→
Pro March V - Transport W - Transport W - March V - Marc		1	2	(3)	4

Reviewed By:	36 2	
,		•

Title of Instructional Materials:

ALGEBRA I — NUMBER AND QUANTITY (N)

The Real Number System (N-RN)

Use properties of rational and irrational numbers.	Summary and documentation of how the domain, cluster, and standard a		
N-RN.3 Explain why the sum or product of two rational numbers is rational; that the	met. Cite examples from the materials.		
sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.	1 2 3 4		
	Skills and Procedures 1 2 3 4		
	Mathematical Relationships 1 2 3 4		
	Summary / Justification / Evidence		
Indicate the chapter(s), section(s), and/or page(s) reviewed.	•		
Act 1-2 Act 1-3 Unit 4 Overvus Unit 4 Reflection	Portions of the domain, cluster, and standard that are missing or not well developed in the instructional materials (if any): No explanation of why - just modeling, mostly I rational #5		
Unit 4 Mars Standards Row	Overall Rating 1 2 3 4		

Reviewed By:	

Title of Instructional Mat	terials:
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ALGEBRA I — NUMBER AND QUANTITY (N)

Quantities (N-Q)

Reason quantitatively and use	e units to solve problems.	Summary and documentation met. Cite examples from the	n of how the d	omain, cluste	r, and standa	rd are
N-Q.1			-			
multi-step problems; choose and	nd problems and to guide the solution of d interpret units consistently in formulas; and the origin in graphs and data displays.*	Important Mathematical Ideas	1	2	3	4
Note: Foundation for work with expressi	ons, equations and functions.	Round Control				
		Skills and Procedures	1	2	3	4
		Mathematical Relationships	1	2	3	→ 4
Indicate the chapter(s), section	on(s), and/or page(s) reviewed.	Summary / Justification / Evid Docan't seem to hit do or converting bown w of showing graphical	dence muchy gr nits; howe	apho atan	t where t	hey
Act 1-5 Act 1-7 Unit 1 Math Stds Ruw	EA 3-1 Au-3-6 Act 4-1	Portions of the domain, clust developed in the instructional	er, and standa	ard that are m		
EA 2-1 Act 2-5	Act 4-3 Act 4-6	Overall Dation				
Unit 2 Unit Prac Act 3-1	Unit 4 Unit Prac Act 6-4	Overall Rating	1	1 0	3	4

Reviewed By:

Title of Instructional Materials:

ALGEBRA I — NUMBER AND QUANTITY (N) Quantities (N-Q)

Reason quantitatively and us	se units to solve problems.	Summary and documentation of how the domain, cluster, and standard a met. Cite examples from the materials.		
N-Q.2 Define appropriate quantities for the purpose of descriptive modeling.* Note: Foundation for work with expressions, equations and functions.		Important Mathematical Ideas 1 2 3	4	
		Skills and Procedures 1 2 3 Mathematical Relationships 1 2 3	4	
		Summary / Justification / Evidence		
Indicate the chapter(s), section (ct) - 5	ion(s), and/or page(s) reviewed.		1	
1-7 Whit I MHL Stats Brus CA 2-1 OCH 2-4	Unit 2 Unit Prac Unit 5 Overus Act 3-1 3-2 5-4 5-5 EA 5-2 Act 3-6 Unit 2 Unit Prac Unit 5 Overus	Portions of the domain, cluster, and standard that are missing or not we developed in the instructional materials (if any):	ell	
2·5 2·6 2-8	4-1 4-3 4-6	Overall Rating 1 2 3	→ 4	

Reviewed By:	

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T:41-	- f I4.	onal Materials:	
11116	OI Instruction	anai Materials.	

ALGEBRA I — NUMBER AND QUANTITY (N)

Quantities (N-Q)

Reason quantitatively and use units to solve problems.		Summary and documentation of how the domain, cluster, and standard are met. Cite examples from the materials.				
N-Q.3 Choose a level of accuracy appropriate to limitation	7 # 2 +v	Important Mathematical Ideas	+			
reporting quantities.*	ons on measurement when		1	2	3	4
Note: Foundation for work with expressions, equations and fur	nctions.	1 o 2 o 3 o 3 o 3 o 3 o 3 o 3 o 3 o 3 o 3				
3/4/45	Contra Signa or	Skills and Procedures				
				2	3	4
		Mathematical Relationships				→
			I	2	3	4
		Summary / Justification / Ex Mentions exact value of	vidence	envise, mot	real aprice	fica
Indicate the chapter(s), section(s), and/or page(s) reviewed.		how to choose				
6-1		Portions of the domain, cluded developed in the instruction	ster, and st	andard that are s (if any):	missing or no	t well
EA 6-2		No mention of DE	g. figo.			
Muit 6 Unit Prac Act 4-3						
5-3		Overall Rating	4.1	7 1	1	1.

Reviewed By:	

Title of Instructional Materials:

ALGEBRA I — ALGEBRA (A)

Interpret the structure of expressions.	Summary and documentation met. Cite examples from the	on of how t	he domain, clu	uster, and stand	dard are
A-SSE.1a	The same of the sa	c materials.			
1. Interpret expressions that represent a quantity in terms of its context.*	Important Mathematical Ideas				→
 Interpret parts of an expression, such as terms, factors, and coefficients. 	THE OF BEAT	1	2	3	4
Note: Linear, exponential, quadratic.	Skills and Procedures				
	Okins and Procedures	+			
		1	2	3	4
	Mathematical Relationships	4-1	1		
		1	2	3	4
					·
	Summary / Justification / Ev	vidence			
Indicate the chapter(s), section(s), and/or page(s) reviewed.					
Unit Overes Ep. 4-2					
AC-1-1 Estate EA 1-1	Portions of the domain, clus developed in the instruction	ster, and sta	andard that are	e missing or no	t well
Act 1-5	Noexponential				
that I Reft.	1 - 1 - 1 - 2 - 2 - 1 - 4				
Act 41					
4-4	Overall Rating				
4-7	- Total rating	+))
77		1	2	3	4

Reviewed By:	
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Title of Instructional Materials:

ALGEBRA I — ALGEBRA (A)

Interpret the structure of expressions.	Summary and documentation of how the domain, cluster, and standard ar met. Cite examples from the materials.
 A-SSE.1b Interpret expressions that represent a quantity in terms of its context.* b. Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret P(1+r)ⁿ as the product of P and a factor not depending on P. Note: Linear, exponential, quadratic. 	Important Mathematical Ideas 1 2 3 4 Skills and Procedures 1 2 3 4
	Mathematical Relationships 1 2 3 4
	Summary / Justification / Evidence
Indicate the chapter(s), section(s), and/or page(s) reviewed.	
Unit 1 Math Stds Rever A ct 2-5 2-4 Unit 2 Prac Unit 2 Math Stds Brut	Portions of the domain, cluster, and standard that are missing or not well developed in the instructional materials (if any): no expon. liftle to no quad.
Act 3-5 Unit 4 Math Stds Ruw	Overall Rating 1 2 3 4

Reviewed By:	

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litle	Ot.	Instructional	Matariala
1 ICIC	OI	mod detional	Materials.

ALGEBRA I - ALGEBRA (A)

Interpret the structure of expressions.	Summary and documentation of how the domain, cluster, and standard a met. Cite examples from the materials.
A-SSE.2	process and materials.
Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.	Important Mathematical Ideas 1 2 3
Note: Linear, exponential, quadratic.	
	Skills and Procedures 1 2 3
	Mathematical Relationships 1 2 3
	Summary / Justification / Evidence
Indicate the chapter(s), section(s), and/or page(s) reviewed.	
2A 4-1 Unit 4 Prac. Unit 50000 Acr 5-3 5-4 5-5	Portions of the domain, cluster, and standard that are missing or not wel developed in the instructional materials (if any):
Unit 5 Pact Unit 5 Refl.	Overall Rating 1 2 3 4

Reviewed By:	
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Title of Instructional Materials:

ALGEBRA I - ALGEBRA (A)

Write expressions in equivalent forms to solve problems.	Summary and documentation met. Cite examples from the	on of how the materials.	he domain, clu	ster, and star	ndard are
A-SSE.3a	Improved and Made and discalled an				
 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.* 	Important Mathematical Ideas	1	2	3	4
 Factor a quadratic expression to reveal the zeros of the function it defines. 	Albania and the second				
Note: Quadratic and exponential.	Skills and Procedures	1	2	3	4
	Mathematical Relationships	+			<u>_</u>
		1	2	3	4)
	Summary / Justification / Ev	/idence			
Indicate the chapter(s), section(s), and/or page(s) reviewed.					
Act 5-3 5-4 5-5	Portions of the domain, clust developed in the instruction	ster, and st	andard that are s (if any):	missing or i	not well
EA 5-2 Unit 5 Prac Unit 5 Pett					
unit 5 math 5tds RVW	Overall Rating	+			
		1	2	3	4

Reviewed By:

Title of Instructional Materials:

ALGEBRA I - ALGEBRA (A)

Seeing Structure in Expressions (A-SSE)

Summary and documentation of how the domain, cluster, and standard are Write expressions in equivalent forms to solve problems. met. Cite examples from the materials. A-SSE.3b Important Mathematical Ideas 3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.* b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. Skills and Procedures Note: Quadratic and exponential, Mathematical Relationships Summary / Justification / Evidence - Hit only on I example + few pract. probl.
- Not elate to man or min Indicate the chapter(s), section(s), and/or page(s) reviewed. Unit SOVEW Portions of the domain, cluster, and standard that are missing or not well developed in the instructional materials (if any): Overall Rating

Reviewed By:			

Title of Instructional	
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ALGEBRA I - ALGEBRA (A)

Write expressions in equivalent forms to solve problems.	Summary and documentation of how the domain, cluster, and standard are met. Cite examples from the materials.
A-SSE.3c	
3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.*	Important Mathematical Ideas 1 2 3 4
 c. Use the properties of exponents to transform expressions for exponential functions. For example the expression 1.15' can be rewritten as (1.15^{1/12})^{12t} ≈ 1.012^{12t} to reveal the approximate equivalent monthly interest rate if the annual rate is 15%. Note: Quadratic and exponential. 	Skills and Procedures 1 2 3 4
	Mathematical Relationships 1 2 3 4
Indicate the chapter(s), section(s), and/or page(s) reviewed.	Summary / Justification / Evidence No big conversation of changing; however, discussion of what different parts mean
EA 4-1 Unit 4 Prac	Portions of the domain, cluster, and standard that are missing or not well developed in the instructional materials (if any):
	Overall Rating .

Reviewed By:

Title of Instructional Materials:

Important Mathematical Ideas

ALGEBRA I - ALGEBRA (A)

Arithmetic with Polynomials and Rational Expressions (A-APR)

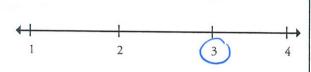
Summary and documentation of how the domain, cluster, and standard are Perform arithmetic operations on polynomials. met. Cite examples from the materials. A-APR.1

Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.

Note: Linear and quadratic.

Skills and Procedures

Mathematical Relationships



Summary / Justification / Evidence

Indicate the chapter(s), section(s), and/or page(s) reviewed.

Act 3-5 unit 4 Pract. Unit 4 Refl Unit 4 Math Stds Ruw

Portions of the domain, cluster, and standard that are missing or not well developed in the instructional materials (if any):

Overall Rating

Reviewed By:	
•	
Title of Instructional Materials:	

ALGEBRA I — ALGEBRA (A)

Creating Equations (A-CED)

met. Cite examples from the	e materials.	ne domain, ciu.	ster, and stan	dard are
				<u></u>
Important Mathematical Ideas	1	2	3	4
Skills and Procedures	4			
	1	2	3	4
Mathematical Relationships	(→
	1	2	3	4
Summary / Justification / Ev	/idence			
Portions of the domain, clus developed in the instruction	ster, and st	andard that are	missing or n	ot well
Overall Rating				
	met. Cite examples from the Important Mathematical Ideas Skills and Procedures Mathematical Relationships Summary / Justification / Eventual Portions of the domain, clusted developed in the instruction	met. Cite examples from the materials. Important Mathematical Ideas Skills and Procedures Mathematical Relationships 1 Summary / Justification / Evidence Portions of the domain, cluster, and st developed in the instructional material	met. Cite examples from the materials. Important Mathematical Ideas 1 2 Skills and Procedures 1 2 Mathematical Relationships 1 2 Summary / Justification / Evidence Portions of the domain, cluster, and standard that are developed in the instructional materials (if any):	Important Mathematical Ideas

Reviewed By:

Title of Instructional Materials:

Documenting Alignment to the Standards for Mathematical Practice

1. Make sense of problems and persevere in solving them.

Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves. "Does this make sense?" They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.

Indicate the chapter(s), section(s), or page(s) reviewed.

Portions of the mathematical practice that are missing or not well developed in the instructional materials (if any):

Summary/Justification/Evidence





Reviewed By:	
Title of Instructional Materials:	

Documenting Alignment to the Standards for Mathematical Practice

2. Reason abstractly and quantitatively.

Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

Indicate the chapter(s), section(s), or page(s) reviewed.

Portions of the mathematical practice that are missing or not well developed in the instructional materials (if any):

Summary/Justification/Evidence





Algebra 1

Seeing Structure in Expressions A-SSE

Interpret the structure of expressions

- 1. Interpret expressions that represent a quantity in terms of its context.
- a. Interpret parts of an expression, such as terms, factors, and coefficients.
- b. Interpret complicated expressions by viewing one or more of their parts as a single entity. For example interpret P(1÷r) as the product of P and a factor not depending on P.
- 2. Use the structure of an expression to identify ways to rewrite it. For example, see $x_1 y_1$ as $(x_2)_2 (y_2)_2$, thus recognizing it as a difference of squares that can be factored as $(x_2 - y_2)(x_2 + y_2)$.

Write expressions in equivalent forms to solve problems

- 3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.*
- a. Factor a quadratic expression to reveal the zeros of the function it defines.
- b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.

C. Use the properties of exponents to transform expressions for exponential functions. For example the expression 1.15; can be rewritten as (1.15; 12) 12 = 1.012; to reveal the

approximate equivalent monthly interest rate if the annual rate is 15%.

approximate equivale	nt monthly interest rate if the annual	rate is 15%.	1 11	O II/Evidonco
	Development	Connections	Rigor and Depth	Overall/Evidence
Mathematical Ideas	Are ideas conceptually developed (4) or approached from a simple skill level (1)?	Are ideas expanded to other math ideas (4) or developed independently of each other (1)?	Do ideas require extension of important ideas and the use of multiple approaches (4) or only using procedures and memorization (1)?	Factorias -conex Complete sq. y. 34,
	4 3 2 1	4 3 2 1	3 2 1	
Skills and Procedures	Are skills and procedures integrated with math ideas (4) or are they the primary focus of the lesson (1)?	Are skills and procedures connected to other ideas (4) or treated as isolated skills with no connection (1)?	Are skills and procedures critical to the application of other math ideas (4) or are they practiced without conceptual development (1)?	
	4 3 2 1	4 3 2 1	4 3 2 1	Acoloni to the
Mathematical Relationships	Are math relationships evident to build understanding (4) or appear as a series of independent skills (1)?	Are relationships integrated with other math ideas (4) or are problems focusing on drill only(1)?	Do relationships require a broad use of math (4) or only require the use of skills and procedures (1)?	preas, factoria/multiply,
	4 3 2 1	4 3 2 1	4 3 2 1	

Missing or weak content from this standard

Overall for this Standard:

Algebra 1

Arithmetic with Polynomials and Rational Expressions A -APR

Perform arithmetic operations on polynomials

1. Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.

Op. 231 -

		Devel	opme	nt	(Conne	ection	S	Rig	jor an	id Dej	oth	Overall/Evidence
Mathematical Ideas	Are id	leas conc oped (4) a simple	ceptually or appr	oached	math id	eas expai deas (4) ndently (or devel	oped	import of mult only us	ant ideas iple app	e extens and the roaches edures a	use (4) or	
and the state of t	4	3 20	2	1	4	3.	2	1	4	3	2	1	
Skills and Procedures	integr or are of the	kills and rated wit they the lesson	h math i e primar	deas (4)	connector or trea	ils and pated to or ted as is connec	ther idea olated s	as (4) kills	critical other r they p	to the a nath ide acticed	rocedure pplication as (4) or without relopmen	n of are	
	4	<i>b</i>	2	1	1	سر	_	4		i	-	-	
Mathematical Relationships	to bu appea	nath rela ild under ar as a si endent s	rstanding eries of		with of	ationship ther mat oblems fo)?	h ideas ((4) or	broad require	use of m	s require lath (4) (e of skills ?	or only	
	4 3 2 1 4 3 2 1							1	4	3	2	1	

Missing or weak content from this standard

Overall for this Standard:

Algebra 1

Creating Equations A -CED

Create equations that describe numbers or relationships

1. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.

2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

3. Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.

4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law V = IR

to highlight resistance R.

to highlight resis									Di		d Dor	ath	Overall/Evidence
	[Devel	opme	nt	(Conne	ections	<u>S</u>			ıd Dep	וווע	Overall/ Evidence
Mathematical Ideas	Are id develo	eas condoped (4)	ceptually or appro skill leve	ached	math io	as expai deas (4) ndently (or devel	oped	importa of mult only us	ant ideas iple app	e extens and the roaches tedures a	ion of use (4) or and	CED 1 948-49 CED 1 48-49 CED 1 948-49 CED 1 948-49
	4	3	2	1	4	3	2	1	4	3	2	1	(EDI gand, p.320
Skills and Procedures	integr or are	rated wit	procedui h math i e primar (1)?	deas (4)	connector or trea	lls and pated to o ted as is connec	ther idea solated si	as (4) kills	critical other r they pr	to the a nath ide acticed	orocedure applicatio as (4) or without relopmen	n of are	
	4	3	2	1	4	3	2	1	4	3	2	1	
Mathematical Relationships	to bu	ild unde ar as a s	rstanding		with o	lationshi ther mat oblems f)?	h ideas i	(4) or	Do relationships require a broad use of math (4) or only require the use of skills and procedures (1)?				
	4	3	2	1	4	3	2	1					

Missing or weak content from this standard

Overall for this Standard: _

Algebra 1

Reasoning with Equations and Inequalities A -RE I

Understand solving equations as a process of reasoning and explain the reasoning

1. Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

Solve equations and inequalities in one variable

3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

4. Solve quadratic equations in one variable.

a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form (x-p)2 = q that has the same solutions. Derive the quadratic formula from this form.

 \hat{S} olve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the

initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \, \mathbb{I} \, \} \, bi$ for real numbers a and b.

		Devel	opmei	nt	(Conne	ections	S	<u> </u>		<u>nd De</u>		Overall/Evidence
Mathematical Ideas	Are id	deas conc oped (4) a simple	eptually or appro	ached	math i	deas (4)	nded to o or devel of each o	oped	importa of mult only us	ant idea: iple app	re extens s and the proaches cedures a (1)?	e use (4) or	nutiple Moracles to
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Skills and Procedures	Are skills and procedures integrated with math ideas (4) or are they the primary focus of the lesson (1)?				connector or treat	cted to o	ther idea colated si tion (1)?	ıs (4) kills	Are skills and procedures critical to the application of other math ideas (4) or are they practiced without conceptual development (1)?				Conceptual approach to egants. Quadratics pp. 203 — Levelapant: - contact 49 p. 34
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Overall for this Standard: __________

Algebra 1

Reasoning with Equations and Inequalities A -RE I

Solve systems of equations

- 5. Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.6. Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.
- 7. Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line y = -3x and the circle $x^2 + y^2 = 3$.
- 8. (+) Represent a system of linear equations as a single matrix equation in a vector variable.
- 9. (+) Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension 3 × 3 or

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Overall for this Standard: __

Algebra 1

Reasoning with Equations and Inequalities A -RE I

Represent and solve equations and inequalities graphically

10. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).

11. Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.

12. Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the

solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

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Overall for this Standard:

Algebra 1

Interpreting Functions F-IF

Understand the concept of a function and use function notation

1. Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then f(x) denotes the output of f corresponding to the input x. The graph of f is the graph of the equation y = f(x).

2. Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context. 3. Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci

sequence is defined recursively by $f(0) = \underline{f(1)} = 1$, f(n+1) = f(n) + f(n-1) for $n \ge 1$.

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Overall for this Standard: _

Algebra 1

Interpreting Functions F-IF

Interpret functions that arise in applications in terms of the context

4. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.

5. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.

6. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of

change from a graph.

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Algebra 1

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Analyze functions using different representations

- 7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
- a. Graph linear and quadratic functions and show intercepts, maxima, and minima.
- b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.
- e. Graph exponential functions, showing intercepts and end behavior.
- 8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.
- a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.
- b. Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as y = (1.02)t, y = (1.02)t(0.97)t, y = (1.01)12t, y = (1.2)t/10, and

classify them as representing exponential growth or decay.

9. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example.

given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.

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CONTENT STANDARDS RUBRIC Algebra 1

Building Functions F-BF

Build a function that models a relationship between two quantities

- 1. Write a function that describes a relationship between two quantities.
- a. Determine an explicit expression, a recursive process, or steps for calculation from a context.
- b. Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.
- c. (+) Compose functions. For example, if T(y) is the temperature in the atmosphere as a function of height, and h(t) is the height of a weather balloon as a function of time, then T(h(t)) is the temperature at the location of the weather balloon as a function of time.
- 2. Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.

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Overall for this Standard:

Algebra 1

Building Functions F-BF

Build new functions from existing functions

- 3. Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.
- 4. Find inverse functions.

a. Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse. For example, f(x) = 2x3 or

f(x) = (x+1)/(x-1) for $x \ne 1$.

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Overall for this Standard: _

Algebra 1

Linear, Quadratic, and Exponential Models F-LE

Construct and compare linear, quadratic, and exponential models and solve problems

- 1. Distinguish between situations that can be modeled with linear functions and with exponential functions.
- a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.
- b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.
- c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.
- 2. Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two inputoutput pairs (include reading these from a table).
- 3. Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.

Interpret expressions for functions in terms of the situation they model

5. Interpret the parameters in a linear or exponential function in terms of a context.

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Overall for this Standard: _____